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YALE PEABODY MUSEUM  
OF NATURAL HISTORY

Number 79

April 20, 1964

New Haven, Conn.

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## NOTEWORTHY AMPHIPODA (CRUSTACEA) IN THE COLLECTION OF THE YALE PEABODY MUSEUM

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During the last half of the nineteenth century the Peabody Museum of Natural History, Yale University, was the focus of much marine biological research. A. E. Verrill and S. I. Smith amassed a considerable collection of North American invertebrates and exchanged specimens with European biologists. In the course of my curatorial work on the amphipod crustaceans in this collection a number of interesting locality records and type specimens have come to light.

The type specimens are primarily those of S. I. Smith and B. W. Kunkel. Smith apparently based his descriptions on several specimens of each species and designated no types, so I have chosen lectotypes where this was warranted by the condition and locality data of the collections. The type terminology used follows the recommendations of the International Code of Zoological Nomenclature (Stoll et al., 1961). Four of Smith's species are redescribed here from lectotype specimens. They are *Melita nitida*, *Ampithoe longimana*, *A. valida* and *Cymadusa compta*. These are common New England or Middle Atlantic Coast species, so these redescriptions should be helpful for com-

parative purposes. A generic diagnosis has been included for each redescribed species.

I have examined some probable type specimens of Bermuda amphipods described by Kunkel (1910), including those of *Pariphinotus tuckeri*, *Ceradocus colci*, *C. parkeri*, *Elasmopus magnispinatus*, *Eusiroides verrilli* and *Ampithoe pollex*. The poor condition of the specimens makes designation of lectotypes inadvisable for all species except *Eusiroides verrilli*.

Paratypes of the recently described species *Ampelisca vadorum* and specimens of *Listriella clymenellae* from the type locality are also present in the Peabody Museum collections and are listed here. Interesting locality records for a number of other species are also included in this paper.

Professor W. D. Hartman encouraged the curatorial and systematic work on these collections. I am grateful for his support and for the stimulus of conversations on systematic zoology. Dr. Fenner A. Chace, Jr., of the United States National Museum, helped me with problems of type nomenclature. This work was supported financially under NSF grants G-10772 and GB-583 to Yale University.

Abbreviations used in the species discussions are: YPM—Yale Peabody Museum catalogue number; USFC—United States Fish Commission; USNM—United States National Museum accession number.

#### Family AMPELISCIDAE G.O. Sars

##### *Ampelisca vadorum* Mills

*Ampelisca vadorum* Mills, 1963, p. 971-989, figs. 1-3.

**Material:** YPM 5642—Sta. 1, Long Island Sound, Conn., 41°11.1'N, 73°08.8'W. Coarse sand, depth 10-12 meters. Dredge with stramin liner. 24 May 1962. S. W. Richards, collector. 2 adult ♂♂, 10 adult ♀♀, paratypes. YPM 5643—same data 10 juv. ♂♂, 10 juv. ♀♀, paratypes.

##### *Ampelisca spinimana* Chevreux

*Ampelisca spinimana* Chevreux, Chevreux and Fage, p. 81-82, fig. 73.

April 20, 1964 Peabody Museum Amphipoda

**Material:** YPM 4698—USNM 37152. Sta. 36B, (Steamer "Bache") 42°18'N, 69°49'W, 23 1/2 mi. ENE 1/4 N from Race Pt., 142 fm. (260 meters). Soft blue mud. Sept. 1873. 1 specimen.

This species has been recorded only recently from North America and appears to be widespread on the continental slope (Mills, 1963).

*Ampelisca eschrichti* Krøyer

*Ampelisca eschrichti* Krøyer, Gurjanova, 1951, p. 307-308, fig. 170.

**Material:** YPM 5008—45 fm. (82 meters). Georges Bank, 41°25'N, 66°45'W, 16 Sept. 1872. S. I. Smith and Oscar Harger. 1 juv. ♂.

Seven lots of this species are present in the Yale collections. Six are from boreal and subarctic waters of Labrador and the Gulf of St. Lawrence. However, one collection, described above, is a southern record for the species on the East Coast of North America. Smith and Harger (1874) record "*Ampelisca* sp." in this haul on the east side of Georges Bank. *Ampelisca macrocephala* is known to be common on Georges Bank (Roland L. Wigley, personal communication), but the present species must be rare or absent now, with the recent warming of New England waters. (Taylor, Bigelow and Graham, 1957).

Family PHLIANTIDAE Stebbing

*Pariphinotus tuckeri* Kunkel

*Pariphinotus tuckeri* Kunkel, 1910, p. 19-21, fig. 6.

**Material:** YPM 5613—Bermuda, 1901, W. G. Van Name. 1 broken ♂ ; 1 ♀, 5.5 mm.

Kunkel's (1910) description was undoubtedly based on these two specimens. Since the specimens were dessicated and the male now lacks head and urosome Kunkel's description must stand.

## Family LILJEBORGIIDAE Stebbing

*Listriella clymenellae* Mills

*Listriella clymenellae* Mills, 1962, p. 158-162, figs. 1, 2.

**Material:** YPM 4492—Sta. F (Sanders), Barnstable Harbor, Mass., sand flats in *Clymenella* tubes, August, 1960, H. L. Sanders. 5 specimens. YPM 4493—Sta. A (Sanders), Barnstable Harbor, Mass., in tube of *Clymenella torquata*, 5 August 1959, Eric L. Mills. 1 specimen.

These specimens were collected at the type locality (Mills, 1962.)

## Family GAMMARIDAE Leach

*Crangonyx pseudogracilis* Bousfield

*Crangonyx pseudogracilis* Bousfield, 1958, p. 102-105, fig. 16.

**Material:** YPM 5473—Axelshop Pond, Mount Carmel, Conn., weedy area, 15 Oct. 1961, Eric L. Mills. 9 juveniles.

This is apparently the first record under this name for Connecticut. Bousfield (1958) suggested that the species would be present in Atlantic state watersheds. Kunkel's (1918) records of *Crangonyx gracilis* Smith from New Haven, Conn., and Providence, R. I. (as *Eucrangonyx gracilis*), are partially referable to *C. pseudogracilis* (Bousfield, 1958). Bousfield has shown that *Crangonyx gracilis* has been authentically recorded only from the Great Lakes basin, while *C. pseudogracilis* is a widespread species of warm, shallow fresh waters.

Genus *Melita* Leach 1813/1814 (cited by Stebbing, 1906.)

Stebbing (1906, p. 421) defines the genus as follows:

"Body slender, peraeon smooth, pleon with one or more of the segments dorsally dentate and armed with bristles. Head not rostrate, lateral corners rounded. Side-plate 4 the largest, emarginate behind. Eyes usually distinct, rather small. Antenna 1 slender, longer than antenna 2, 1st and 2nd joints rather long, 3rd not short, with accessory flagellum. Mouth-parts, so far as known, normal. Upper lip with small central emargination. Lower lip, inner

lobes tolerably distinct. Mandibular palp rather slender. Maxilla 1, inner plate with several setae, outer with 11 spines. Maxilla 2, inner plate sometimes with setae on inner margin. Maxillipeds, outer plates with teeth on inner margin, passing into slender spines on apex. Gnathopod 2 larger, often unequal, and one in the male sometimes larger than the other, sometimes approximately chelate. Peraeopods 3-5, 2nd joint well-expanded. Peraeopods 4 and 5 subequal, longer than others. Branchial vesicles simple. Marsupial plates narrow. Uropod 2 the shortest. Uropod 3 projecting much beyond the others, outer ramus long, 2nd joint wanting or rudimentary, inner ramus very short. Telson small, deeply cleft. Some characters subject to much variation within the species."

*Melita nitida* Smith

(Fig. 1)

*Melita nitida* Smith, (in: Verrill and Smith, 1873, p. 560-561).

Della Valle, 1893, p. 716. Holmes, 1905, p. 505-506, figs.

Kunkel, 1918, p. 99-100, fig. 22. Shoemaker, 1935a, p. 70-71, fig. 2.

**Diagnosis:** 1) Gnathopod 1 propodus oblong, palm transverse, with projection defining lower corner. 2) Gnathopod 2 propodus, palm and lower margin forming a single even curve. 3) Hind margins of peraeopod 3-5 bases finely serrated and setose. 4) Pleon and urosome not dentate, with only a few spines on each side of the midline of urosome segment 2.

**Description:** MALE (8.7 mm) LECTOTYPE. Fig. 1 (a-p). Head only as long as first two body segments combined; interantennal lobe large, rounded above, rather square below. First antenna stout, a little longer than second; peduncle about equal in length to flagellum; flagellum with 20 articles; accessory flagellum of 3 articles. Second antenna stout; 4th peduncle segment with a few small ventral setae; 5th peduncle segment with several groups of long curved setae on ventral margin; flagellum of 12 articles, about half again as long as 5th peduncle segment.

Epistome finely setose and slightly angular below, but not medially notched or emarginate. Mandible, incisor process with 3 teeth, lacinia mobilis finely dentate, molar process strong, projecting outwards; palp, second segment with 3 groups of marginal setae, 3rd segment inner margin lined with long setae. Lower lip inner plates not fully

distinct from outer plates; both plates finely setose on the medio-distal margins. Maxilla 1, inner plate distal margin oblique, with several setae; outer plate with 9 pectinate spines; palp, second segment with 5 spines and several setae. Maxilla 2, inner and outer plates equal in length, inner with distal margin oblique and heavily setose, outer with distal margin transverse and setose. Maxilliped, inner plate slightly emarginate distally with an oblique row of setae; outer plate inner margin evenly set with 11 small spines which grade distally into 3 long stout spine setae; palp curved distally, second segment setose medially, 3rd segment sparingly setose.

Coxal plates rather shallow, first 3 deeper than wide, oblong, rounded distally; fourth with a posterodistal lobe rounding evenly into the distal margin; fifth and sixth small, with rounded anterior and posterior lobes; seventh small, rounded below.

Gnathopod 1, basis flattened and slightly expanded; carpus longer than propodus, lower margin with several groups of long, strong setae; propodus oblong, slightly curved, dactyl arising in middle of almost transverse palmar margin; propodus palmar margin defined by finely setose prominence at corner; dactyl very short, stout. Gnathopod 2, propodus greatly expanded, thick, palmar margin set with spinules, rounding evenly into an almost straight lower margin; dactyl long, stout, when closed fitting into a long oblique groove lined with setae on inner side of propodus.

Peraeopods 1 and 2 almost equal in size, short, rather slender. Peraeopods 3, 4 and 5 very similar, highly spinose, bases with groups of spines on anterior margin, posterior margins finely serrated and setose; peraeopod 3 the shortest; peraeopods 4 and 5 about equal in length.

Epimeral plate posterior margins setose, first two slightly rounded posteriorly, with a small tooth at the posterodistal corner; third with square or slightly toothed posterodistal corner. Pleopod peduncles and rami slender; coupling spines 2, hook-shaped. Dorsal pleonal and urosomal teeth absent.

Urosome short, second segment with 3 to 5 articulated spines on either side of the dorsal mid-line. Uropod 1 extending slightly beyond uropod 2, peduncle margins with strong spines, rami with apical spine groups; outer ramus outer margin with 4 spines, inner margin 2 spines; inner ramus outer margin with 3 spines, inner margin with 5 spines. Uropod 2, peduncle margins spinose, rami with apical spine groups, outer ramus outer margin with 4 spines, inner margin with 2 spines; inner ramus outer margin with one spine, inner margin with 3 spines. Uropod 3 peduncle stout; outer ramus

very long, margin and apex with groups of strong setae; inner ramus very small, with 2 apical spines, set in a sinus of the peduncle. Telson short, deeply cleft and spread, lobes with 2 to several spines apically.

**FEMALE** (9.3 mm) **PARALECTOTYPE**. Fig. 1 (u-z, aa). Very similar to male in most features. Antennae slightly shorter, but flagellum articles same in number as in male. Gnathopod 1 smaller than in male, propodus shape similar. Gnathopod 2 smaller than in male, carpus lower margin longer and with more groups of stout setae; propodus similar in shape to that of male, but palmar margin minutely serrated and with a stout spine at the lower corner; propodus lacking setose groove into which dactyl of male fits; dactyl with a tooth near the tip. Peraeopod 4 coxa projected into a curved, finger-like lobe anteriorly, rather than the short, rounded lobe of the male.

**Type locality:** Great Egg Harbor, New Jersey.

**Material:** YPM 1247—Great Egg Harbor, New Jersey. A. E. Verrill and S. I. Smith. April 1871. "*Melita polita*." 1 lectotype ♂, 8.7 mm, 8 paralectotype ♂♂ (one dissected by Kunkel, 1918), 5 paralectotype ♀♀. YPM 4897—New Haven, Connecticut, S. I. Smith. 11 ♂♂, 8 ♀♀, 5 juv. YPM 4899—probably New Jersey or Long Island Sound. S. I. Smith. No data. "*Melita polita*." 1 ♂, 4 juv.

**Discussion:** Shoemaker (1935a) figured specimens of this graceful species from Sinaloa, Mexico. The type specimens described here have been refigured for comparative purposes, although Shoemaker's figures characterize the species well. At the time of Shoemaker's paper the species was known from Cocos Island, Ecuador, Panama, the west coast of Mexico, and from Louisiana to Cape Cod (see Pearse, 1913, and Kunkel, 1918). E. L. Bousfield (personal communication) has collected the species as far north as Pugwash, Nova Scotia.

*Ceradocus colei* Kunkel

*Ceradocus colei* Kunkel, 1910, p. 41-43, fig. 15

**Material:** YPM 4532—no data. Specimen dry, examined 1961. Probably Bermuda (no locality label with specimen.) 1 ♀, about 5 mm.

This was probably the "single female specimen" mentioned in Kunkel's description. Over the course of the years the specimen dried out and has broken into three pieces. New figures of the species are essential to replace Kunkel's meagre drawings, but they could not possibly be made from this material.

*Ceradocus parkeri* Kunkel

*Ceradocus parkeri* Kunkel, 1910, p. 39-41, fig. 14.

**Material:** YPM 4534—no data. Specimen dried out. Bermuda? (No locality label with specimen.) 1 ♂, 6 mm.

This specimen lacks most of the head appendages [apparently lost since Kunkel's (1910) description] and is not satisfactory for a redescription.

*Elasmopus magnispinatus* Kunkel

*Elasmopus magnispinatus* Kunkel, 1910, p. 54-56, fig. 20.

**Material:** YPM 4543—no data. Probably Bermuda, 1901, A. E. Verrill. 2 ♀ ♀; 8 juv. ♂ ♂.

Kunkel's description and figures must stand, since his original specimens are in poor condition.

*Gammarus (Gammarus) fasciatus* Say

*Gammarus (Gammarus) fasciatus* Say, Bousfield, 1958, p. 69-72, fig. 4.

**Material:** YPM 4506—Mashpee River, near Route 28, Cape Cod, Mass. Weed, cool stream. 16 July 1961. Eric L. Mills, collector. 1 ovig. ♀, 12 juvs. YPM 4529—Mill River below Axelshop Pond, Mount Carmel, Hamden, Conn. Roots and weeds, edge of river. 15 Oct. 1961. Eric L. Mills, collector. 28 juvs. YPM 4628—Woodbridge, Conn. A. E. Verrill, 5 specimens.



These three collections help to fill in the range and occurrences listed by Bousfield (1958). The Woodbridge, Conn. collection is undoubtedly that mentioned by Kunkel (1918, p. 107). Smith (1874a) first documented the occurrence of the species in Connecticut.

*Gammarus (Rivulogammarus) lacustris lacustris* G. O. Sars.

*Gammarus robustus* Smith, 1874b, p. 610, pl. 2, fig. 7-12; Barnard, 1958, p. 55.

*Gammarus limnaeus* Smith (in part), Shoemaker, 1920, p. 16.

*Gammarus lacustris lacustris*, Bousfield, 1958, p. 80-81, fig. 8.

**Material:** YPM 4876—"Gammarus robustus," Wasatch Mountains (Utah). L. E. Ricksecker, collector. 3 broken ♀♀.

The status of Smith's *Gammarus robustus* has remained a mystery since its description, although Shoemaker (1920) placed it with *G. limnaeus* (= *G. lacustris*) and Bousfield (1958) suspected that this move was correct. Smith's original specimens have now come to light in the Yale collections, and, after examining them, Dr. Bousfield has informed me that they are females of *G. l. lacustris*. The above synonymy establishes the status of Smith's species with certainty.

#### Family PLEUSTIDAE Stebbing

##### *Neopleustes pulchellus* (Krøyer)

*Neopleustes pulchellus* (Krøyer), Gurjanova, 1951, p. 643-645, figs. 439, 440.

**Material:** YPM 1301-USFC, (B1), 50 fm. (92 meters), 1872. USNM 35646. Georges Bank, 41°25'N, 66°25'W. S. I. Smith and O. Harger. 1 ♀.

This is apparently the southernmost record in New England. Holmes (1905) recorded the species (as *Paramphithoe pulchella*) from Grand Manan, New Brunswick, and Shoemaker (1930) includes Casco Bay, Maine, in his distribution records. As mentioned in the case of *Ampelisca eschrichti* Krøyer, warm-

ing trends in New England waters may make Georges Bank unsuitable at present for some arctic and subarctic species, perhaps including *Neopleustes pulchellus*.

Family ATYLIDAE G. O. Sars

*Atylus swammerdami* (H. Milne-Edwards)

*Paratylus swammerdami* (H. Milne-Edwards), G. O. Sars, 1895, p. 463-465, pl. 163.

*Atylus swammerdami*, Barnard, 1958, p. 31.

**Material:** YPM 5632—Sta. 1231. "Fish Hawk." Vineyard Sound Lightship, W by N  $1\frac{1}{2}$  N; Cuttyhunk N by W  $\frac{3}{4}$  W; Gay Head SE  $\frac{3}{4}$  E. 16 fm. (29 meters). Sand. 29 Aug. 1887. 1 juv., 6 mm.

There are apparently no other records of *Atylus swammerdami* from North America. This specimen agrees well with specimens from the west of Ireland collected by Canon A. M. Norman about 1866 (YPM 5620), but differs slightly from Sars' (1895) figures in having a more convex hind margin of the peraeopod 5 basis and a setose hind margin of the peraeopod 4 basis which is not projected at the posterodistal corner.

Other species of the genus are apparently not common on the East Coast of North America, although *A. carinatus* (Fabricius) occurs as far south as the St. Lawrence estuary (Brunel, 1961b), and Shoemaker (1932) summarizes occurrences of *Nototropis* (now *Atylus*) *minikoi* Walker from Chesapeake Bay to Brazil.

Family EUSIRIDAE Stebbing

*Eusiroides verrilli* (Kunkel)

*Pontogeneia verrilli*, Kunkel, 1910, p. 29-31 fig. 10.

*Eusiroides verrilli*, Schellenberg, 1929, p. 273-282.

**Material:** YPM 5338—#11. Castle Harbor. Bermuda? A. E. Verrill. 1 lectotype ♀, 9 mm, (figured by Kunkel); 2 paralecto-

type adult ♂♂, 8 and 10 mm; 32 paralectotype ♀♀; 3 paralectotype juveniles.

A dissected adult female, 9 mm, is apparently the specimen used by Kunkel (1910, fig. 10) for his description of the species (as *Pontogeneia verrilli*). It is designated a lectotype. Kunkel's description and figure seem adequate, so the species has not been redescribed.

#### Family PODOCERIDAE Stebbing

##### *Dulichia spinosissima* Krøyer

*Dulichia spinosissima* Krøyer, Gurjanova, 1951, p. 990-991, fig. 688.

**Material:** YPM 5618—Sta. 81. West Harbor, Fisher's Is., N.Y. Fisher's Is. Sound. Sand and shells. 3½ fm. (6.4 meters). 10 Aug. 1874. USFC. 1 broken juv. ♂.

Brunel (1961a) records this species from the Gulf of St. Lawrence. The present specimen is apparently the southernmost record of the species.

#### Family AMPITHOIDAE Stebbing

Genus *Ampithoe* Leach 1813/1814 (cited by Stebbing, 1906.)

Stebbing (1906, p. 631) defines the genus as follows:

"Head without rostrum. Side-plates 1-5 well developed, 5th as wide as 4th, with a very small hind lobe. Antenna 1 without accessory flagellum, usually longer than antenna 2, though with shorter peduncle. Mouthparts prominent below the head. Upper lip distally rounded. Lower lip . . . inner lobes well developed; outer lobes bifid; mandibular processes prominent. Mandible normal, principle and secondary plate multidentate, spines in spine row numerous, molar of moderate size; 3rd joint of palp sometimes widened distally and crowded with setae, at others not widened and slightly armed. Maxilla 1, inner plate very small, usually with 1-3 setae, outer plate with 10 spines; 2nd joint of palp with several spical spines. Maxilla 2, outer plate the larger, inner distally-narrowed, inner margin not very elongate. Gnathopod 1 subchelate, usually the smaller. Gnathopod 2 usually subchelate, stronger in ♂ than in

♀ and generally of a different shape. Peraeopods 1 and 2, 2nd joint expanded, sometimes greatly, for the cement glands, the secretion from which issues through the apex of the finger to supply fibres for constructive purposes. Peraeopods 4 and 5 longer than the others. Uropod 3, outer ramus carrying 2 reverted spines. Telson short, usually or always having the angles of the apex minutely hooked."

*Ampithoe longimana* Smith

(Figs. 2, 3)

*Ampithoe longimana* Smith, (in: Verrill and Smith, 1873, p. 563). Holmes, 1905, p. 509, figs. Kunkel, 1910, p. 87, fig. 34. Kunkel, 1918, p. 147-149, fig. 43.

*Ampithoe longimana* Smith, Stebbing, 1906, p. 634, 738. Pearse, 1913, p. 376. Barnard and Reish, 1959, p. 36-37, pl. 12.

**Diagnosis:** 1) Antenna 2 peduncle segments 4 and 5 of ♂ long. 2) Gnathopod 1 propodus of ♂ long, even in width. 3) Uropod 3 rami very short, rounded. 4) Peraeopod 5 basis convex, spine at posterodistal angle.

**Description:** MALE (10.1 mm) LECTOTYPE Fig. 2 (a-t). 3 (u). Head short, length less than first two body segments combined; interantennal lobe with rounded margins, rather prominent; inferior antennal sinus with oblique, gently-rounded posterior margin; eye yellowish-brown in alcohol, with about 50 facets.

Antenna 1 as long as body; peduncle extending a little beyond 4th peduncle segment of antenna 2, 1st peduncle segment with a few setae and one short spine distally, 2nd segment longer than 1st, lightly setose; 3rd segment about  $\frac{1}{2}$  length of second; flagellum  $1\frac{1}{2}$  to 2 times length of peduncle, of 29 articles. Antenna 2 stout; peduncle long, 4th segment about equal to first two segments of antenna 1 peduncle in length, 5th segment slightly longer than 4th; flagellum equal in length to 5th peduncle segment, of 23 articles.

Mouthparts projecting below head. Upper lip rounded and finely setose below. Mandible, palp slender, third segment lightly expanded distally, armed with several long plumose setae; incisor process strongly toothed; lacinia mobilis large, associated with a few slender spines; molar process with ridged triturating surface. First maxilla,

palp apical segment curved, outer plate armed with 10 strong dentate spines. Second maxilla inner plate short, outer margin short, oblique, inner margin setose along its entire length; outer plate projecting over inner distally. Lower lip outer plates with marked lateral projections; medial margins with deep rounded incisions. Maxilliped, outer plate armed with rather small spines; inner plate inner margin partially oblique, set with plumose setae.

Gnathopod 1, coxa projected anterodistally; basis with an anterodistal rounded lobe armed with a few spines; carpus elongated; propodus long, even in width, palmar margin short and transverse, armed with a blunt spine near the dactyl and several setae, lower margin of segment slightly concave and heavily set with groups of setae; dactyl long, inner margin dentate. Gnathopod 2 basis with an anterodistal rounded lobe; carpus wide, about  $3/4$  length of propodus; propodus only slightly shorter than that of gnathopod 1 but much wider, lower margin slightly concave, palm oblique, concavity defined by a ventral projection, with a quadrate setose lobe near base of dactyl, palm and lower margin set with groups of long setae; dactyl dentate on inner margin, extending length of palm.

Peraeopods 1 and 2 short, very similar; basis expanded medially; propodus narrow, with a few setae ventrally; dactyl short,  $1/3$  length of propodus.

Peraeopod 3, coxa with a large anterior lobe and small posterior lobe; basis expanded, rounded anteriorly and posteriorly; dactyl stout, curved.

Peraeopods 4 and 5 very similar in form, but 4 shorter than 5, extending at most to the middle of peraeopod 5 propodus. Peraeopod 4, coxa slightly lobed anteriorly; basis rounded posteriorly, with a small posterodistal concavity marked by a single spine; merus, carpus and propodus about equal in length. Peraeopod 5 coxa rather narrow, slightly concave distally; propodus longer than carpus, about equal in length to merus.

Gills all simple, short and broad.

Epimeral plates; first very short, rounded anteriorly, slightly concave posteriorly; second strongly rounded anteriorly, posterior margin convex proximally, becoming slightly concave near posterodistal corner; third strongly rounded anteriorly, posterior margin convex above posterodistal corner. Pleopod rami about half again as long as peduncles; coupling spines short, apex with one hook on one side, 2 on the other.

Uropods all extending to same point. Uropod 1 stout, peduncle with 7 spines on outer margin, 10 on inner margin; outer ramus

shorter than inner, outer margin evenly set with 8 spines, inner margin with 2 spines only; inner ramus outer margin with two spines, inner margin with 3 spines. Uropod 2 stout; peduncle margins each with 4 to 5 spines; outer ramus slightly shorter than inner, outer margin with 6 spines, inner margin with 4 spines; inner ramus outer margin with 3 spines, inner margin with 5 spines. Uropod 3 short; rami very short, rounded, outer ramus with 2 lateral hooks, inner ramus with an apical spine, 2 lateral spines and a tuft of apical setae; distal margin of peduncle with 6 spines.

Telson short, narrowed, quadrate, and with 4 setae distally.

**FEMALE** (9.7 mm) **PARALECTOTYPE** Fig. 3 (v-y). Antenna 1 peduncle more slender than in male but proportions about the same; flagellum of 25 segments, extending  $3/4$  length of body. Antenna 2 less robust than that of male, peduncle segments 4 and 5 slender, almost equal in length; flagellum of 17 articles.

Gnathopod 1 carpus shorter and smaller than male, almost straight ventrally; propodus about equal to carpus in length, palmar margin rounded, oblique, dactyl long, dentate, half its length beyond palm. Gnathopod 2 propodus shorter and smaller than in male, palmar margin convex near dactyl, gradually becoming concave ventrally, palm with quadrate lower corner.

Oostegites present on gnathopod 2 and pereopods 1-3, lobate, broad, fringed on most margins with long curved setae. Uropod 3 with 1-3 spines on inner ramus inner margin.

Other features as in male.

**Type locality:** Vineyard Sound, Mass.

**Material:** YPM 5214—Vineyard Sound, Mass. U. S. Fish Commission, 1871. 1 lectotype ♂, 8 paralectotype ♂♂. YPM 5215—Vineyard Sound, Mass. U. S. Fish Commission, 1871. 8 paralectotype ♀♀ (1 figured). YPM 4631—Great Egg Harbor, N.J. (?) A. E. Verrill and S. I. Smith, 1872, 1 juv. ♀. YPM 5238—no data. Several dessicated specimens. YPM 5239—Provincetown, Cape Cod, low water, USFC. Aug. 22, 1879. USNM 35662. 2 adult ♂♂, 1 juv. ♂, 1 ovig. ♀ YPM 5240—Long Island Sound, USFC, 1874. USNM 35619. 1 adult ♂. YPM 5241—Long Island Sound, USFC, 1874. USNM 35618.

**Discussion.** The material here described and figured was almost certainly that used by Smith for his original descrip-

tion of the species (in: Verrill and Smith, 1873). Smith did not mention the numbers of animals in his original collection. Among the specimens in this series is one which Kunkel (1918) apparently used for his figure 43. However, since this specimen was incomplete and no trace could be found of missing appendages, the lectotype chosen was a male in better condition.

One difference was noted between Smith's description and the material at hand. All specimens examined had yellow-brown eyes, while Smith stated their color was black. Fresh specimens of the species from Sengekontacket Pond, Martha's Vineyard, Mass., in my personal collection, have dark brown eyes in alcohol. Thus it seems that eye pigment gradually leaches out after years in preservative.

Barnard (in: Barnard and Reish, 1959) outlines the range of *A. longimana* as including the United States East Coast, Bermuda (see Kunkel, 1910), and parts of southern and lower California. Barnard's figures show that the California populations are virtually identical with those on the East Coast. Table I outlines the main morphological differences between females of the present species and females of *Ampithoe rubricata* (Montagu).

#### *Ampithoe pollex* Kunkel

*Ampithoe pollex* Kunkel, 1910, p. 93, fig. 36.

*Grubia indentata* Stout, 1913, p. 656-657. Shoemaker, 1941, p. 188.

*Ampithoe pollex*, J. L. Barnard, 1954, p. 29-31, figs. 27-28.

**Material:** YPM 5291—probably Bermuda, A. E. Verrill, 2 ♂♂, 5.5 mm and 3.8 mm.

Kunkel's type material consists of two damaged males which agree well with his figures (1910) and with the description and figures of Barnard (1954). Since the species is so well characterized no attempt has been made to figure the poor specimens at hand.

TABLE 1. Main morphological differences between females of *Ampithoe longimana* and *Ampithoe rubricata*.

	<i>A. longimana</i> ♀	<i>A. rubricata</i> ♀
Eye	Round, large.	Slightly oval, small.
Antenna 1	Peduncle slender.	Peduncle stout.
Antenna 2	Peduncle segment 4 and 5 slender.	Peduncle segment 4 and 5 more stout.
Mandible	Palp segment 3 almost linear.	Palp segment 3 flattened, inflated distally.
Gnathopod 1	Propodus narrow, palm short; dactyl longer than palm.  Carpus lower margin long, shallowly rounded.	Palm longer, dactyl equals palm length.  Carpus lower margin short, more sharply rounded.
Gnathopod 2	Very similar in both	
Peraeopod 5	Basis hind margin widest proximally, convex. <i>Spine at posterior angle.</i>	Basis even width throughout, hind margin linear. <i>No spine at posterior angle.</i>
Uropod 1	Outer ramus inner margin with 2 spines.	Outer ramus inner margin spineless.
Uropod 2	Outer ramus inner margin and inner ramus outer margin with spines.	Outer ramus inner margin and inner ramus outer margin lacking spines.
Uropod 3	Rami very short, rounded.  Inner ramus with a few spines and few apical setae.	Rami $\frac{1}{2}$ length of peduncle or more, less rounded.  Inner ramus with several spines, large clump of apical setae.
	Outer ramus with no lateral setae.	Outer ramus with clumps of lateral setae.
Telson	Few apical setae.	Several apical setae (3/side)



*Ampithoe valida* Smith

(Fig. 4)

*Ampithoe valida* Smith (in: Verrill and Smith, 1873, p. 563).

*Ampithoe rubricata* (in part), Della Valle, 1893, p. 459.

Holmes, 1905, p. 510. Kunkel, 1918, p. 149-151.

*Ampithoe valida*, Stebbing, 1906, p. 635. J. L. Barnard, 1954, p. 34-35, pl. 31. Alderman, 1936, p. 68.

*Ampithoe shimizuensis* Stephensen, 1944, p. 77-80, figs. 28, 29.

**Diagnosis:** 1) Gnathopod 1 carpus and propodus broadly expanded, carpus with broad lobe on lower margin. 2) Gnathopod 2 propodus massive, palm almost transverse, with a blunt, square tooth medially. 3) Uropod 3 rami half length of peduncle, outer ramus with 2 stout out-curved spines. 4) Antenna 2 only slightly shorter than antenna 1.

**Description:** MALE (12.7 mm) LECTOTYPE. Fig. 4 (a-q). Head slightly shorter than first two body segments combined; interantennal lobe large, slightly truncated, corners rounded.

Antenna 1 about half as long as body, peduncle segments 1 and 2 equal in length; flagellum of 35 articles. Antenna 2 slightly shorter than antenna 1, peduncle segment 5 slimmer than 4, about equal to it in length; flagellum with 20 articles.

Epistome slightly rounded and finely setose below.

Mandible, incisor process with 6 sharp teeth; lacinia mobilis large and toothed; 6 pectinate spines between incisor and molar processes; molar process well-developed, ridged and sclerotized; palp 3rd segment broad, with several setae on the curved distal margin. Maxilla 1, last segment of palp rounded distally, bearing 8 spines and a seta; outer plate with 10 stout spines; inner plate small, unarmed. Maxilla 2, inner plate setose along entire inner margin; outer plate projecting over inner plate distally. Maxilliped, palp segments short; outer plate with 11 small short spines on inner margin, grading into longer spines distally; inner plate broadly rounded distally and set with marginal setae.

Gnathopod 1, coxa projected anterodistally; basis with an anterodistal rounded lobe laterally; carpus broad, with a lateral fringe of long setae on the upper margin, lower margin broadly lobed, extending partly over the base of the propodus; propodus almost as broad as carpus, palmar margin rounding evenly into lower margin, defined

by a spine at the lower corner; dactyl stout and short. Gnathopod 2, basis stout, with a large anterodistal lateral lobe; merus projecting slightly below carpus; carpus short, with a few setae on a lower lobe; propodus massive, slightly expanded distally, palm almost transverse, with a small square median tooth and a rounded prominence at the lower corner; dactyl stout, tip fitting behind prominence at lower corner of palm.

Peraeopods 1 and 2 very similar; basis expanded, setose on the hind margin; carpus and propodus slender. Peraeopod 3 basis rounded, with a few spines on the anterior margin; propodus with 5 spines on anterior margin; dactyl pointed outward or forward. Peraeopods 4 and 5 quite similar, peraeopod 4 short, extending to about middle of peraeopod 5 propodus, its basis with a sharp notch posterodistally.

Epimeral plate 1 rounded anteriorly, with a slight posterodistal tooth and a squarish projection posteriorly; epimeral plate 2 rounded posteriorly, with a slight tooth at the posterodistal corner; epimeral plate 3 larger than 2, quite similar in shape. Pleopod peduncles stout, coupling spines 9, mushroom-shaped; rami about half again as long as peduncles, of 16-18 segments.

Urosome short, flattened. Uropods all extending to same point. Uropod 1 long; outer ramus slightly over half as long as peduncle, shorter than inner ramus, outer margin with 6 spines, inner margin spineless; inner ramus outer margin spineless, inner margin with 4 spines. Uropod 2, outer ramus outer margin with 5 spines, inner margin spineless, inner ramus outer margin spineless, inner margin with 3 spines. Uropod 3 short, peduncle about twice length of rami, dorsal surface with 3 spines at base of outer ramus and 2 at base of inner ramus; outer ramus with 2 out-curved spines distally; inner ramus with 4 short spines and a tuft of setae distally and a small spine on the outer margin.

Telson short, distal corners slightly notched, apex slightly acute (rounded in some specimens), dorsal surface with setae near margins and at distal corners.

FEMALE. The collections contain a number of juvenile females, all previously identified as *A. valida*. All, however, are indistinguishable from females of *A. longimana*. It appears that Smith's original collection contained both species and that he or a subsequent viewer of the material mistook the female of *A. longimana* for that of *A. valida*. Smith (in: Verrill and Smith, 1873, p. 563) says of the female of *A. valida*: "The female differs in having the hands of the first pair of legs slightly more elongated, and those of the

second pair more elongated than in the male, and the palmar margin slightly oblique."

This description fits the gnathopod condition of a paralectotype juvenile male exactly, and presumably the female of the species is very similar. It is possible that Smith's description was based on this paralectotype male.

Alderman (1936) undoubtedly saw a female of *A. valida*, since his description is based on a mating pair. Of the female gnathopod characters he says only (p. 68): "First gnathopod somewhat more slender in female than in male . . . Fifth joint of second gnathopod in female produced as in male, shorter than sixth joint. Palm smooth, convex. Second joint as in male."

Further collections are necessary to clarify the morphology of the female.

**Type locality:** Beesley's Point, New Jersey.

**Material:** YPM 1230—Beesley's Point, New Jersey. A. E. Verrill and S. I. Smith, April 1871. 1 lectotype ♂ (12.7 mm), 5 paralectotype adult ♂♂, 1 paralectotype juv. ♂.

**Discussion.** Uncertainties about the identification and description of females have been discussed previously.

Smith's description (in: Verrill and Smith, 1873) fits the specimens at hand very closely, except that the specimens have pale brown eyes, rather than black. This is certainly attributable to leaching of color in alcohol, as discussed for *A. longimana*.

On the United States East Coast *A. valida* is apparently known only from the type locality, although Smith (in: Verrill and Smith, 1873) noted its presence in Long Island Sound. Alderman (1936) and Barnard (1954) both record the species from the United States West Coast (California and Oregon, respectively). Alderman's description differs from Smith's specimens in a few points, all probably attributable to size difference.

These differences are:

	<i>Alderman's description</i>	<i>Smith's specimens</i>
Size	9-11 mm	10-13 mm
Antenna 1 flagellum	50 articles	35 articles
Antenna 2 flagellum	25 articles	20 articles
Antenna 2 peduncle segment 4	Half again as long as 5	Equal to 5 in length
Maxilla 1 inner plate	9 spines	10 spines

Barnard's figures indicate that his specimen may have been slightly subadult, since the limbs are less spinose than the New Jersey material figured here and the male gnathopod 1 is slightly less developed. However, agreement is very close.

Holmes (1905) first placed *A. valida* in the synonymy of *A. rubricata*, and his action was followed by Kunkel (1918). Holmes stated (p. 510): "Specimens sent to the U. S. National Museum by Professor Smith under the name *Amphithoe valida*, and which I have examined, agree well with Professor Smith's description of that species, which is certainly identical with *A. rubricata*." Holmes' mistake could have been due to the examination of immature specimens of *A. valida*. Mature males are quite distinct in the character of both pairs of gnathopods.

#### Genus *Cymadusa* Savigny 1816.

Ruffo (1947, p. 168) defines this genus as follows: "Characters of the genus *Amphithoe* Leach. . . , but first pair of antennae provided with an accessory flagellum of 1-6 articles. The genus is particularly distinguished by the following combination of characters; mandible furnished with a well-developed palp, first pair of antennae provided with an accessory flagellum."

*Cymadusa compta* (Smith) new combination  
(Figs. 5, 6)

- Amphithoe compta* Smith, 1873 (in: Verrill and Smith, 1873, p. 564.)  
*Grubia compta*, Holmes, 1905, p. 510-511, figs. Kunkel, 1918, p. 151-153, fig. 45. ?Shoemaker, 1921, p. 102.  
*Amphithoides comptus*, Stebbing, 1906, p. 645.  
? *Grubia* sp., Pearse, 1913, p. 376.  
Not *Grubia compta*, Pearse, 1913, p. 376, fig. 6.  
*Grubia hirsuta* Chevreux (in part), Schellenberg, 1925, p. 186-187.  
*Cymadusa filosa* Savigny (in part), Pirlot, 1939, p. 64-67.

**Diagnosis:** 1) Coxae of gnathopods 1 and 2 sparingly setose. 2) Gnathopod 1 propodus palmar margin slightly concave. 3) Gnathopod 2 carpus of  $\delta$  long, without distinctly projecting ventral lobe. In  $\text{♀}$ , gnathopod 2 carpus with a large, round-margined ventral lobe. 4) Gnathopod 2 propodus equal in width to carpus, dactyl longer than palmar margin. 5) Antenna 1 flagellum with about 33 articles; antenna 2 flagellum with 20-28 articles.

**Description:** MALE (8.6 mm). LECTOTYPE. Fig. 5 (a-p). Head slightly shorter than the first two body segments combined; inter-antennal lobe square and projecting; hind margin oblique; inferior margin slightly concave. Eye slightly ovate, straw-colored in specimens in alcohol.

Antenna 1, first segment of peduncle as long as head; second segment equal in length to first, third segment about  $1/3$  length of second; accessory flagellum of one main article and a small setose apical article; flagellum slender, long, extending almost to end of body, of about 33 articles.

Antenna 2 slightly shorter than antenna 1, peduncle stout, segments 4 and 5 about equal, each armed ventrally with 8-9 groups of long setae; flagellum of 20-28 articles.

Epistome rounded ventrally and finely setose.

Mandible, incisor process large, curved, with 6 sharp teeth; lacinia mobilis stout, armed with several small teeth; 8 setae between incisor and molar processes; molar process ridged and heavily sclerotized;

palp slightly curved, 3rd segment expanded distally and set with several long pectinate setae.

Hypopharynx with well-developed, finely setose, inner lobes, outer lobes bilobed medially.

Maxilla 1, inner plate small, acute apically, with 7 setae on the medial margin; outer plate with 10 stout toothed spines; palp segment 3 expanded distally, bearing 7 short stout spines and one or two setae. Maxilla 2, outer plate large, distal margin oblique, set with long setae; inner plate small, narrowed distally, with an oblique row of setae joining setae found along the entire medial margin.

Maxilliped, inner plate narrow, with 2 or 3 stout spines and several long setae distally and a row of long plumose setae along the medial margin; outer plate set with several long, curved setae distally and with a series of 13 stout spines along the medial margin; palp segments 3 and 4 with groups of long setae medially.

Gnathopod 1, coxal plate small, projecting anteriorly; basis stout, with several groups of long plumose setae near the hind margin; merus with a long anteroventral projection extending nearly half-way along the carpus, set with groups of long plumose setae; carpus long, broad, anterior margin almost straight and square, ventral margin set with thick groups of long plumose setae; propodus shorter than carpus, with thick groups of plumose setae on upper margin, palmar margin oblique, set off by a stout spine at the lower angle, and a slight hump near the attachment of the dactyl, lower margin rounded, receding into a narrow connection with the propodus, with groups of long setae; dactyl stout, curved, inner margin serrated.

Gnathopod 2, coxal plate deeper than wide, corners rounded; basis heavily set with long plumose setae; merus small, with a rounded anteroventral projection armed with groups of long setae; carpus long and broad, upper and lower margins heavily set with long plumose setae; propodus almost as long as carpus and about as wide, with groups of long plumose setae on the upper margin, palmar margin oblique and slightly concave, with a small hump near the base of the dactyl and a small acute projection at the ventral corner; dactyl stout, inner margin serrated.

Peraeopod 1, coxal plate deeper than wide, lower anterior corner rounded, posterior corner almost square; basis stout, glandular (glandular material also present in ischium and merus); carpus and propodus about equal in length, both with several groups of setae on ventral margin; dactyl short, stout, curved. Peraeopod 2 very similar.

Peraeopod 3, coxa with a posterior rounded lobe, lower corners rounded; basis ovate, armed with 6 spines on the anterior margin; merus and carpus about equal, short, stout, with one and two spines on the posterior margin respectively; propodus about half again as long as carpus, with 4 stout spines on the posterior margin and 5 groups of setae on the anterior margin; dactyl short, stout, turned posteriorly.

Peraeopod 4 shorter than peraeopod 5; coxa small, with a rounded anterior lobe; basis narrow, posterior margin concave distally and with 1-2 short spines; merus with 2 spines on posterior margin; carpus slightly shorter than merus, with one spine on the posterior margin; propodus slightly expanded distally, with 5 spines on anterior margin; dactyl stout, turned anteriorly. Peraeopod 5 similar to peraeopod 4, but more stout and longer; coxa not lobed, slightly narrowed distally; basis with a posterior proximal lobe, 3 spines on the posterior margin; propodus more heavily setose than that of peraeopod 4.

Gills short, slightly longer than wide, simple.

Pleon slightly compressed dorsoventrally. Pleopod rami about half again as long as peduncles, with about 13-14 segments. Pleopod coupling hooks anchor-shaped. Epimeral plate 1 small, posterior margin convex, lower posterior corner acute, with a small spine. Epimeral plate 2 with a rounded projection anteriorly, posterior angle acute, posterior margin concave distally, convex proximally. Epimeral plate 3 larger than 2, acute posteriorly, posterior margin gently convex.

Urosome slightly flattened dorsoventrally. Uropods all extending to same point. Uropod 1 stout, peduncle with 5 spines on inner margin, 6 spines on outer, produced into a long ventral spine-like process which extends between the rami; both rami with distal spine groups, inner ramus longer than outer; outer ramus outer margin with 4 spines, inner margin with two spines; inner ramus outer margin with one spine, inner margin with 4 spines. Uropod 2 shorter than 1, peduncle inner margin with 3 spines, outer margin with 4 spines; both rami with distal spine groups; inner ramus longer than outer, inner margin with 4 spines, outer margin with 2; outer ramus, inner margin with 3 spines, outer margin with 4. Uropod 3 short, peduncle with 4 spines on inner margin, 2 spines and 2 groups of ventral setae on outer margin, and 3 short spines at the base of the outer ramus; inner ramus straight, armed with 3 spines on the inner margin, an apical spine and tuft of setae, and one spine on the outer margin; outer ramus curved, with 2 distal spines which curve outward.

Telson short, broad, corners acute, with setae set in notches; 3 groups of lateral setae on each side; dorsal surface with 4 groups of setae.

FEMALE (14.4 mm) PARALECTOTYPE. Fig. 6 (v-z). Quite similar to the male, but antennae a little shorter and more slender and gnathopods considerably smaller.

Antenna 1 flagellum with 37 articles; antenna 2 flagellum with 27 articles.

Gnathopod 1 with only a few long simple setae proximally on the hind margin of the basis; merus with a short, acute anteroventral projection set with a few simple setae extending about  $1/3$  the length of the carpus; carpus broad, with a broad ventral oblique lobe set with simple setae ventrally; propodus about as long as carpus, with only a few long setae on upper margin, palmar margin oblique, but not as much as in male and shorter, defined by a stout spine at the lower corner and a slight hump near the attachment of the dactyl, lower margin slightly rounded, set with groups of setae, receding into narrow connection with the propodus; dactyl stout, inner edge serrated.

Gnathopod 2, basis with several groups of long setae, merus small, with a rounded anteroventral projection armed with groups of long setae; carpus short and broad, with a ventral lobe thickly set with groups of long setae, upper margin almost bare of setae; propodus as long as carpus and about as wide, with a few groups of setae on the upper margin, palmar margin oblique and almost straight, defined by a stout spine at the lower corner; dactyl stout and serrated on the inner margin.

Oostegites long, ovoid, margins with many close-set long setae.

**Type locality:** Vineyard Sound, Mass.

**Material:** YPM 5209—Vineyard Sound, Mass., USFC, 1871. 1 Lectotype  $\delta$  (8.6 mm); 3 paralectotype adult  $\delta \delta$  (1 dissected by Kunkel, 1918); 3 paralectotype juv.  $\delta \delta$ : YPM 5210—Vineyard Sound, Mass., USFC, 1871. 8 ovig.  $\varphi \varphi$ , 4 juv.  $\varphi \varphi$ , paralectotypes. YPM 5211—Long Island Sound, USFC, 1874. 1 juv.  $\delta$ , 1 ovig.  $\varphi$ . YPM 5212—Long Island Sound, USFC, 1 ovig.  $\varphi$ , 5 juvs. YPM 5242—Long Island Sound, USFC, 1874. 1 juv.  $\delta$ .

**Discussion.** This species, described by Smith (in: Verrill and Smith, 1873) as *Amphithoe compta*, has a complicated nomen-



clatural history. Stebbing (1906) transferred the species to the genus *Amphitoides* Kossman, believing it to have only one hook on the outer ramus of uropod 3. Smith's description makes no mention of uropod 3. Holmes (1905) placed the species in the genus *Grubia*. Kunkel (1918) pointed out Stebbing's mistake and retained the genus *Grubia*. Schellenberg (1925) stated "Ich halte nach allem die Arten von Chevreux, Kunkel und Pearse für identisch" and placed *Grubia compta* in *G. hirsuta* Chevreux. With Pirlot's (1938, 1939) resurrection of the genus *Cymadusa* Savigny to replace *Grubia*, *G. compta* and its several synonyms were listed with *Cymadusa filosa* Savigny, as was Schellenberg's "*Grubia hirsuta*." Ruffo (1947) suggested that Smith's species was erroneously included in Pirlot's list. This has proved to be the case, since *C. compta* differs greatly from *C. filosa* and other *Cymadusa* species in its gnathopod characters and seems to have a disparate range.

The known range includes New England (present material), south to North Carolina (Kunkel, 1918, on Smith's authority). Pearse's (1913) record of the species from Florida is *C. filosa*, as Barnard (1955) pointed out, judging by Pearse's figures, in which gnathopods 1 and 2 have been reversed. Pearse also records "*Grubia sp.?*" from Key West, Florida; this may be *C. compta*. Shoemaker's (1921) record of "*Grubia compta*" from Barbados may be *C. filosa*. The latter species seems never to have been taken north of Florida and is undoubtedly tropical.

Kunkel describes the preference of *C. compta* for eelgrass. The species was very common in eelgrass with *Ampithoe longimana* Smith at Sengekontacket Pond, Martha's Vineyard, Mass., in August, 1962.

### *Cymadusa filosa* Savigny

(For synonymy see Barnard, 1955, and Ruffo, 1947.)

**Material:** YPM 5208—no data. Bermuda (?). 2 ♂♂, 2 ♀♀, 2 juv. Probably Kunkel's types of *Grubia coei*. YPM 5213—Bermuda. "*Grubia crassicornis*." 2 ♀♀, 2 juv.

Kunkel (1910, p. 97 and fig. 38) dissected and figured a subadult male of YPM 5208 as *Grubia coei*. These figures and the

specimens are in close agreement with Shoemaker's (1935b) and Ruffo's (1947) figures of *Cymadusa filosa* Savigny and support Pirlot's (1939) and Ruffo's views of the status of *Grubia coei* as synonymous with *C. filosa*.

Although YPM 5213 was labelled "*Grubia crassicornis*," the specimens do not agree with Kunkel's figures (1910, fig. 37) of *G. crassicornis* Costa and so cannot be the specimens on which the figure was based. They are clearly specimens of *Cymadusa filosa*.

The confusion of *C. compta* (Smith) with *C. filosa* Savigny has been discussed earlier in this paper.

*C. filosa* has been recorded from widely separated localities, including Bermuda (Kunkel, 1910), Florida and Puerto Rico (Shoemaker, 1935b), Mediterranean Sea, Red Sea, Canary Islands (Ruffo, 1947), Hawaii, Indian Ocean, Australia and West Africa (summary in Barnard, 1955).

#### Family COROPHIIDAE Stebbing

##### *Erichthonius difformis* H. Milne-Edwards

*Erichthonius difformis* H. Milne-Edwards, Gurjanova, 1951, p. 950-951, fig. 661.

**Material:** YPM 5633—USFC. No other data. 2 adult ♂♂, 2 juv. YPM 5665—Bay of Fundy, USFC, 1872. 20 adults, 4 juv.

Eleven collections of species of the genus *Erichthonius* occur in the Yale collection. Based on male gnathopod 2 characters primarily, nine are *E. rubricornis* (Stimpson), and all were collected in the region from Georges Bank to Halifax Harbour, Nova Scotia. Two collections, listed above, contain *E. difformis*. Most specimens in these two collections agree quite well with Sars' (1895) figures. However, some variability in the form of the male second gnathopod occasionally makes specific identification difficult. Taxonomic problems have been noted in other combinations of species in this genus. Dahl (1946) maintained that *E. difformis* and *E. hunteri* were specifically distinct, while Enequist (1950) suspected that the two forms could be the same species, the variability in form being caused by the effect of environment on growth rates.

It is noteworthy that the form of the male second gnathopod in *E. rubricornis* is closer to that of *E. hunteri* (as illustrated by Sars) than Holmes' (1905) figures would indicate. For this reason, as well as to clarify the problems outlined above, a critical morphological study of the common North Atlantic species would be of great value.

The distribution of *E. difformis* on the East Coast of North America is not clear. Brunel (1961a) records only *E. rubricornis* and *E. tolli* from the Gulf of St. Lawrence region. Some of S. I. Smith's references to *E. difformis* in New England refer to *E. rubricornis*, since some of his specimens in the Yale collection, labelled *E. difformis*, are actually *E. rubricornis*. Holmes (1905) seems to have recognized this fact. The present specimens indicate only that *E. difformis* occurs south at least to the Bay of Fundy.

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## Figure 1.

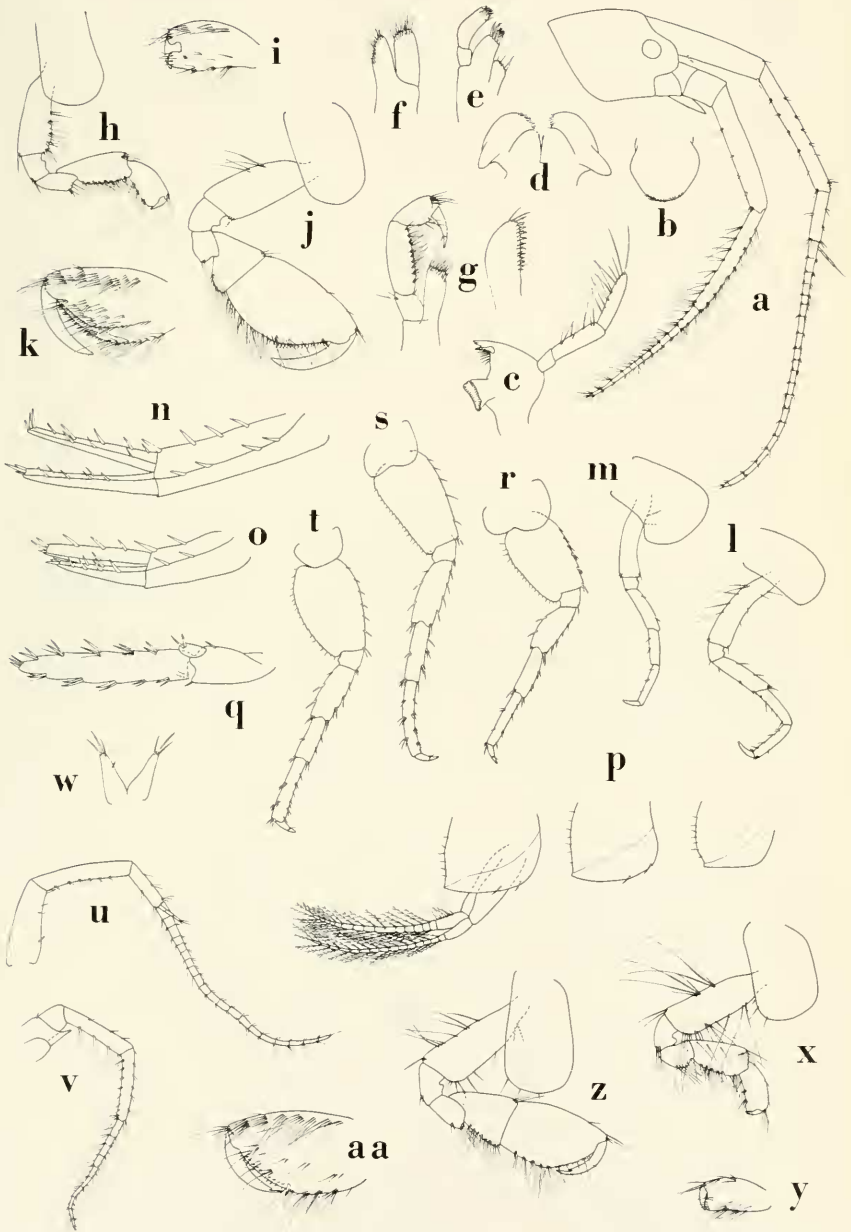
*Melita nitida* Smith. Great Egg Harbor, New Jersey.

LECTOTYPE ♂ (8.7 mm). a, head and antennae. b, upper lip. c, mandible. d, lower lip. e, maxilla 1. f, maxilla 2. g, maxilliped (outer plate separated). h, gnathopod 1. i, gnathopod 1 propodus and dactyl, inner. j, gnathopod 2. k, gnathopod 2 propodus and dactyl, inner. l, peraeopod 1. m, peraeopod 2. n, uropod 1. o, uropod 2. p, epimeral plates 1-3 and 3rd pleopod.

PARALECTOTYPE ♂ (8.9 mm). q, uropod 3.

PARALECTOTYPE ♂ (7.1 mm). r, peraeopod 3. s, peraeopod 4. t, peraeopod 5.

PARALECTOTYPE ♀ (9.3 mm). u, antenna 1. v, antenna 2. w, telson. x, gnathopod 1. y, gnathopod 1 propodus and dactyl, inner. z, gnathopod 2. aa, gnathopod 2 propodus and dactyl, inner.

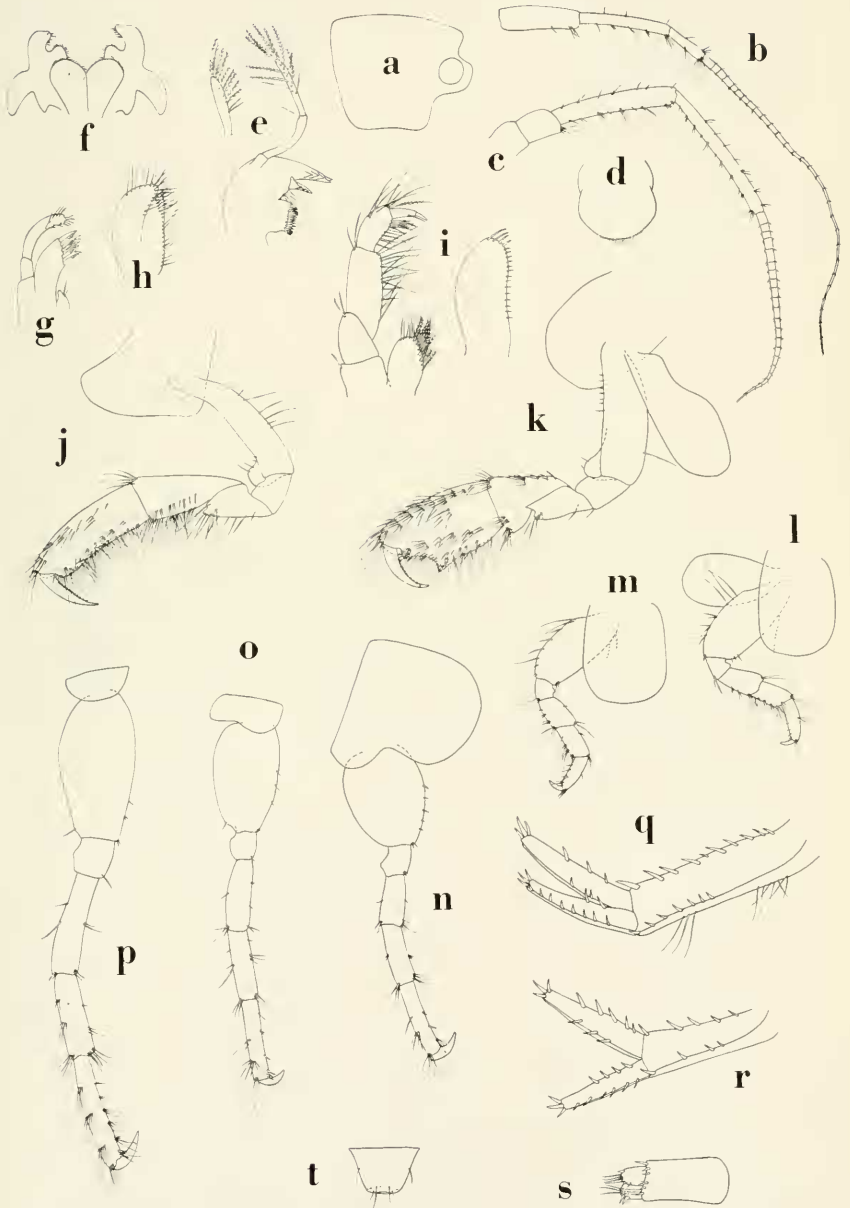


## Figure 2.

*Ampithoe longimana* Smith. Vineyard Sound, Massachusetts.

LECTOTYPE ♂ (10.1 mm). a, head. b, antenna 1. c, antenna 2. d, upper lip. e, mandible (with lateral view of palp terminal segment). f, lower lip. g, maxilla 1. h, maxilla 2. i, maxilliped (outer plate separated). j, gnathopod 1, inner. k, gnathopod 2, inner. l, peraeopod 1. m, peraeopod 2. n, peraeopod 3. o, peraeopod 4. p, peraeopod 5. q, uropod 1. r, uropod 2. s, uropod 3. t, telson.



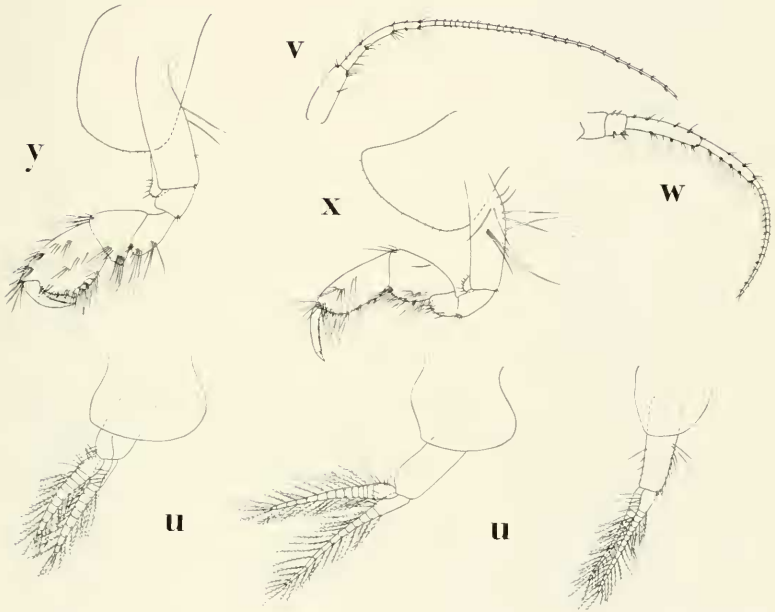


## Figure 3.

*Ampithoe longimana* Smith. Vineyard Sound, Massachusetts.

LECTOTYPE ♂ (10.1 mm). u, epimeral plates 1-3 with pleopods.

PARALECTOTYPE ♀ (9.7 mm). v, antenna 1. w, antenna 2. x, gnathopod 1, inner. y, gnathopod 2, inner.



## Figure 4.

*Ampithoe valida* Smith. Beesley's Point, New Jersey.

LECTOTYPE ♂ (12.7 mm). a, antenna 1. b, antenna 2. c, upper lip. d, mandible (lacinia mobilis and incisor in detail). e, lower lip. f, maxilla 1. g, maxilla 2. h, maxilliped (outer plate separated). i, gnathopod 1. j, gnathopod 2. k, epimeral plate 1. l, epimeral plate 2. m, epimeral plate 3 and pleopod 3. n, uropod 1. o, uropod 2. p, uropod 3. q, telson.

PARALECTOTYPE ♂ (7.9 mm). r, peraeopod 1. s, peraeopod 2. t, peraeopod 3. u, peraeopod 4. v, peraeopod 5. w, head.

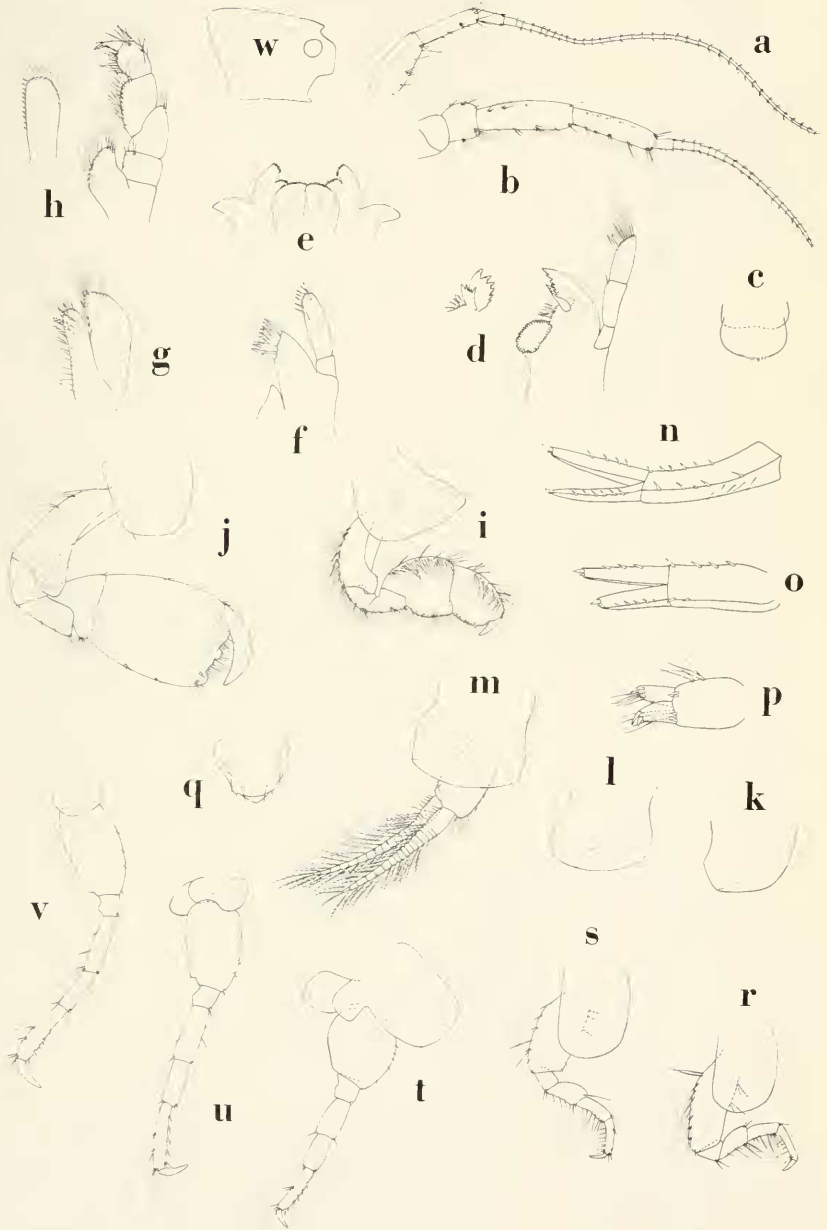
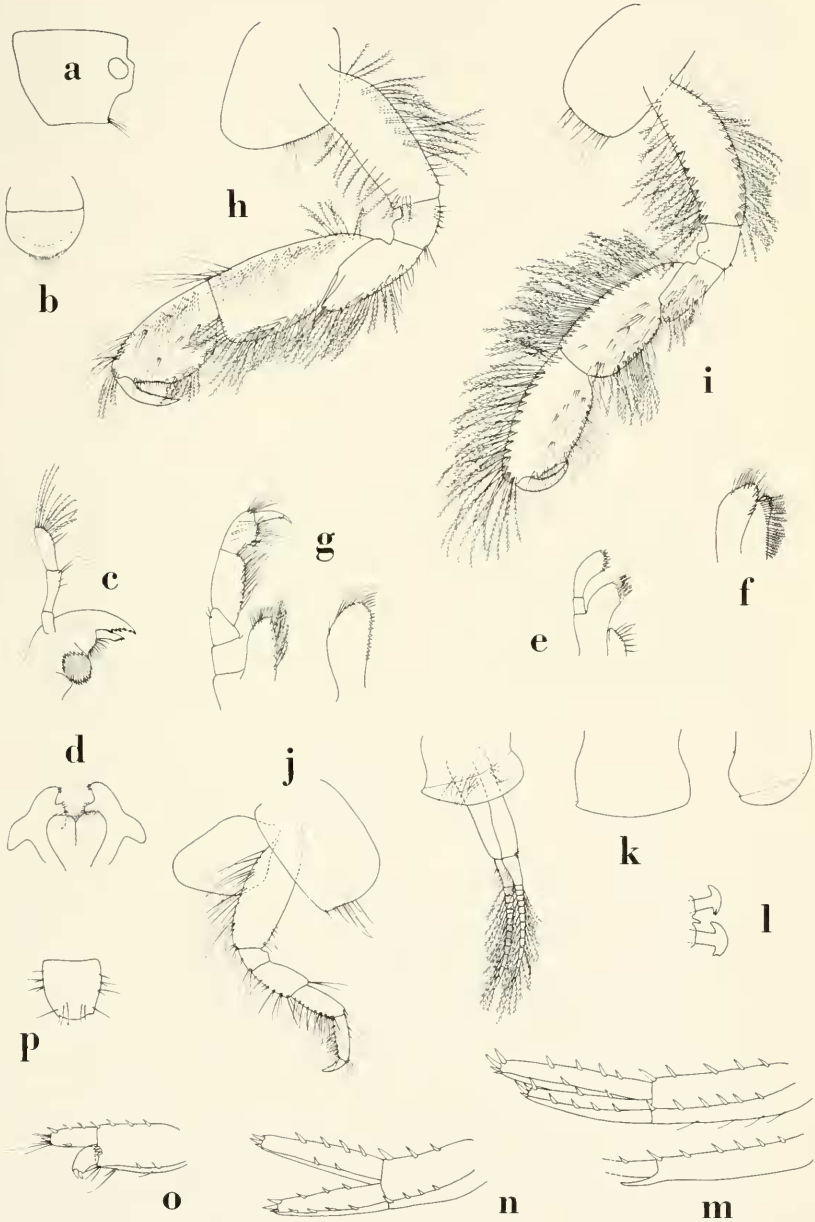


Figure 5.

*Cymadusa compta* (Smith). Vineyard Sound, Massachusetts.

LECTOTYPE ♂ (8.6 mm). a, head, b, upper lip. c, mandible. d, lower lip. e, maxilla 1. f, maxilla 2. g, maxilliped (outer plate separate). h, gnathopod 1 (inner). i, gnathopod 2 (inner). j, peraeopod 2. k, epimeral plates 1-3 (right to left), with pleopod 3. l, pleopod 1 coupling hooks. m, uropod 1 (side view of ventral spine below). n, uropod 2. o, uropod 3. p, telson.



## Figure 6.

*Cymadusa compta* (Smith). Vineyard Sound, Massachusetts.

PARALECTOTYPE ♂ (7.5 mm). q, peraeopod 3. r, peraeopod 5.

PARALECTOTYPE ♂ (12 mm). s, antenna 1. t, antenna 2. u, peraeopod 4.

PARALECTOTYPE ♀ (14.4 mm). v, antenna 1. w, antenna 2. x, gnathopod 1 (inner). y, gnathopod 2 (inner). z, peraeopod 1.



